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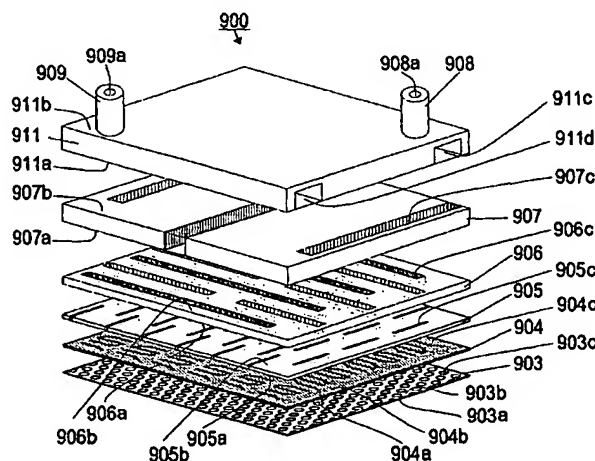
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(54) Title: **BIOREACTORS WITH SUBSTANCE INJECTION CAPACITY**



(57) Abstract: A bioreactor with substance injection capability. In one embodiment, the bioreactor includes a first substrate having a first surface, an opposite second surface and edges. The bioreactor further includes a second substrate having a first surface and an opposite second surface, defining a cavity with a bottom surface, where the bottom surface is located therebetween the first surface and the second surface. The first surface of the first substrate is received by the second surface of the second substrate to cover the cavity so as to form a chamber for receiving cells and a liquid medium. A port is formed in the second substrate between the bottom surface and the first surface of the second substrate. As formed, the port is in fluid communication with the chamber to allow a stream of substance to be introduced into the chamber. The stream of substance is controlled so as to provide a gradient, or a concentration gradient of the substance, to the chamber. The stream of substance includes a substance affecting the growth of cells such as chemokine.